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PROBLEMS FOR SOLUTION.

ALGEBRA.

119. Proposed by HARRY S. VANDIVER, Bala, Montgomery Co., Pa.

$$\text{Given } \tan x = x + \frac{x^3}{3} + \frac{2x^5}{3 \times 5} + \frac{17x^7}{3^2 \times 5 \times 7} + \frac{62x^9}{3^2 \times 5 \times 7 \times 9} \dots$$

Find the general term and interval of convergence of this series.

120. Proposed by JOSIAH H. DRUMMOND, LL. D., Portland, Me.

A hollow sphere has within it a solid sphere; a quantity of water equal to $1/m$ of the capacity of the hollow sphere is poured in and just covers the solid sphere. Prove that there are two solid spheres, either of which answers the conditions; also find the maximum value $1/m$, beyond which the question is not possible.

* * Solutions of these problems should be sent to J. M. Colaw not later than July 10.

CALCULUS.

111. Proposed by G. B. M. ZERR, A.M., Ph.D., Professor of Mathematics and Science, Chester High School, Chester, Pa.

(a). Find the dimensions of a cup, capacity c , in the form of a frustum of a pyramid regular, of n faces, so that its internal surface is a minimum.

(b). Find the dimensions of a cup, capacity c , in the form of a frustum of a hyperboloid or of a paraboloid, whichever it is, so that its internal surface is a minimum.

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MISCELLANEOUS.

91. Proposed by AETEMAS MARTIN, LL. D., U. S. Coast and Geodetic Survey Office, Washington, D. C.

The following sides and area are given for a rational triangle in the table of rational scalene triangles on page 167 of Dr. Halsted's "Metrical Geometry" (Boston, 1881), viz.: sides, 21, 61, 65; area, 420. The same sides and area are given in Septimus Tebay's "Mensuration" (London and Cambridge, 1868), in a table on page 113.

The sides of this triangle can not all be correct because they are all odd.

Assuming that the area given is correct, it is required to determine the error in the sides.

92. Proposed by J. T. COLE, Columbus, Ohio.

A staff $a=60$ feet high, casting a shadow on a horizontal plane due north $b=20$ feet long, falls due northeast. Find the area covered by the shadow.

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